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National Research Council of Canada

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Since its founding in 1916, the National Research Council of Canada has played a major role in Canada's scientific development. It functions today as a national science laboratory, a patron of Canadian scientific research and a vital link between the scientific interests of government, industry and the universities.

The Council's laboratory activities are concentrated in ten major research divisions concerned with various aspects of the life sciences, the physical sciences and engineering. NRC also offers numerous other scientific and technical services across Canada. These facilities, which are intended for a variety of users, are often too expensive or too specialized for most Canadian industries or scientific organizations to support on their own.

In all its research programs, NRC acts in response to Canada's changing needs and scientific priorities.

A large part of the laboratory work centres on basic or exploratory research aimed at the creation and application of new knowledge. In many cases, the results of such fundamental studies ultimately meet some practical need in society.

Applied research

Applied research is today focused on selected areas presenting long-term problems of national concern such as energy, food, building and construction and transportation. NRC also provides research support for the attainment of social objects such as public safety and security, protection of property, health and "environmental quality". Its network of associate committees, whose members are drawn from the universities, from industry and from government laboratories, provides an efficient means for studying, co-ordinating and promoting certain aspects of this research.

The extensive NRC research facilities complement the Council's role as custodian of Canada's primary physical standards, which include the measurement of length, mass, heat, electricity and time. NRC acts for Canada in international agreements concerning weights and measures.

In addition to its "in-house" research activity, NRC is also closely allied with Canadian industry through programs of research and development and through direct financial assistance.

Distribution network

While maintaining this direct contact with Canada's scientific community, NRC is also the focus of a nation-wide distribution network for scientific and technical information.

The Atlantic Regional Laboratory, situated on the campus of Dalhousie University in Halifax, Nova Scotia, operates a marine station on the shore of the Atlantic Ocean at Sandy Cove, near Sambro, Nova Scotia, for the study of marine plants. The Halifax laboratory has facilities for growing and recovering microbial and algal cells, for isolating and identifying plant metabolites, for studying catalysis, and for elucidating biological and chemical syntheses with radioactive and stable isotopes.

Divisional research

The scientific program of the Division of Biological Sciences is carried out by a number of groups of scientists either brought together in research units with a recognized leader or made up of flexible associations of scientists collaborating on an accepted short-term goal. These groups include biologists, chemists, mathematicians and physicists, whose collaboration permits a broad and vigorous approach to the solution of biological problems.

The Division of Building Research carries on a comprehensive research program designed to meet the more

pressing needs of the country for science-based information and knowledge in support of the construction industry. Its activities include: technical support for Central Mortgage and Housing Corporation; technical and secretariat assistance to the NRC associate committee that has responsibility for the production of Canada's National Building Code; service on a large number of standards and technical committees, both national and international; and an information and advisory service to the building industry as a whole.

The work of the Division of Chemistry covers a broad spectrum ranging from relatively short-term programs (aimed at practical application to the natural-resource and chemical industries) to long-term fundamental investigations in selected areas of scientific and technological importance.

In the Division of Mechanical Engineering, distribution of the theoretical and experimental research effort is as follows: transportation engineering, 45 per cent; manufacturing technology, 30 per cent; standards and standardization, 10 per cent; computers in engineering design, 6 per cent; engineering and biological control systems, 5 per cent; medical and surgical instrumentation, 4 per cent. The increased demand on all sides has been met by establishing a Western laboratory in Vancouver,

British Columbia, and by encroaching further on long-range research projects. Previous research has led to a variety of new projects such as a North Sea oil-drilling island and development of a wave-absorbing breakwater design, first used at Baie Comeau, Quebec.

The National Aeronautical Establishment makes major items of experimental equipment available as national facilities to Canadian industry – e.g., its ten wind-tunnels, structural test-rigs, experimental aircraft and standards.

As a result of its competence and equipment in fluid dynamics, structural theory and analysis, materials technology and dynamics, the NAE is well able to tackle a broad range of problems of current importance both in engineering and industrial areas and in social and regulatory areas.

The principal activities of the Division of Physics can be grouped in three related areas: the maintenance of basic physical standards and the calibration of measuring instruments for industries, governments and universities; general-research programs in selected areas of physics; and the improvement of the industrial and social climate of Canada by furnishing advice and information to industries and governments and providing designs for industrial products.

Research at the Prairie Regional Laboratory in Saskatoon, Saskatche-

wan, is concentrated on the measurement and control of the influences of genetics, environment and physiological age on the growth and reproduction of micro-organisms, yeasts, algae, plant cells and higher plants. Fundamental studies provide the necessary groundwork for the practical and applied research in agricultural production and the associated industries.

The Radio and Electrical Engineering Division undertakes engineering projects of interest to Canadian industry and fundamental research in electrical science. New techniques have been developed in electrocardiography and echoencephalography. Much of the research effort in the computer laboratories of this division is concentrated on the interaction between man and computer.

Astrophysics and space research

Laboratory work in the Herzberg Institute of Astrophysics involves: studies of the heavens through the use of optical telescopes and of radio-frequency signals received from different points in the universe by means of radio telescopes; examination of the causes of the sun's activity and the explosive events associated with it; a study of the origins and behaviour of cosmic rays; detection and tracking of meteorites and

rocket-based studies of natural phenomena occurring in the earth's upper atmosphere.

The Space Research Facilities Branch is a support organization that provides services to Canadian scientists engaged in upper-atmosphere and space research by means of sounding rockets, balloons and ground-based instruments.

Aid to industry

NRC's main effort in support of industrial innovation and development is channelled through its Industrial Research Assistance Program. Companies participating in the program have full responsibility for carrying out research in their own facilities or under sub-contract to Canadian universities, provincial research councils or commercial laboratories. They retain all titles and rights to the results of the jointly-funded research. The object of the program, in which NRC and the companies concerned contribute approximately equal shares, is to provide financial assistance to research teams engaged on projects of more than usual significance for the companies' future that also hold some promise of making a significant contribution to the economic well-being of the whole country.

A recent formal development in NRC's support of industry was the introduction in 1975 of the Pilot Industry Laboratory Program, under

which contracts are negotiated with Canadian companies to forward the development of laboratory-initiated projects to the point at which a marketable product is available. This joint program of industry and the Council, which offers assistance in the identification, licensing and development of technologies in the employment of which NRC staff expertise and special facilities can make a significant contribution, has now become a permanent element of the Council's support to industry. By the end of 1977-78, the program had placed \$4.7 million in contracts, and 56 projects were in progress.

Information program

The basic objective of NRC's scientific and technical information program, which covers the operation of the Canada Institute for Scientific and Technical Information and the Council's Technical Information Service, as well as the publication of the *Canadian Journals of Research*, is to facilitate the use of scientific and technical information by the Government and people of Canada.

CISTI services are for user groups in industry, the universities and government that include scientists, engineers and other professionals who can make direct use of items from the world-wide collection of recorded scientific and technical information. The CISTI library, which contains Canada's foremost collection of

scientific and technical literature, has been developed in co-operation with all the major libraries in Canada and is designed to complement local resources and to function as the national science library of Canada. CISTI also performs research into the need for, and improved methods of accomplishing, the transfer of scientific and technical information in response to user needs, and shares in the development of such methods.

For medium-to-small industries, which have a limited amount of highly-trained technical manpower or none at all, and for the highly-trained who find themselves in unfamiliar fields, the Technical Information Service provides advisory services whereby solutions to specific problems are outlined and assistance is given in implementing them. To provide "on-site" assistance, a staff of engineers is stationed in various parts of Canada. This field staff is supported by a group of specialist engineers and scientists in Ottawa. In six provinces, field services are provided by provincial research councils under NRC contract; the remainder are served by 16 TIS offices manned by NRC staff. TIS is able to draw upon not only the extensive practical experience of its own staff but also the knowledge and expertise of NRC researchers and the resources of larger industries and associations.

As a service to Canadian science and a Canadian contribution to the world's scientific literature, NRC publishes the *Canadian Journals of Research*, covering the fields of biochemistry, botany, chemistry, earth sciences, forest research, geotechnology, microbiology, physics, physiology and pharmacology, zoology, and civil engineering. The 11 *Journals* publish approximately 2,500 papers a year, about two-thirds of which are written by Canadian scientists.

The National Research Council administers and provides for Canadian participation in many international scientific activities, including a large number of international organizations. It is responsible for ensuring appropriate Canadian participation in the activities of these organizations and for providing adequate liaison between them and the Canadian scientific community. This responsibility is, in most cases, delegated to an appropriate national committee established by NRC for this specific purpose. National committees are representative of Canadian interests in the fields in question, their members being drawn from industry, government and the universities.



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